

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CANCELLED) A thin film photovoltaic cell formed from at least one semiconductor layer, wherein said at least one semiconductor layer includes a copper-indium-gallium-diselenide film having a band gap ranging from 1.1-1.45 eV, and said thin film photovoltaic cell has a conversion efficiency of at least 9.0%, an open circuit voltage of at least 0.4 V, a current of at least 30 mA/cm², and a fill factor of at least 58%.
2. (CURRENTLY AMENDED) A method for preparing a copper-indium-gallium-diselenide film comprising:
 - providing a substrate;
 - providing a buffered electro-deposition bath having a pH ranging from approximately 2-3 and containing ions of copper, indium, gallium, and selenide, and containing potassium biphthalate and sulphamic acid; and
 - placing said substrate in said buffered electro-deposition bath to form a semiconductor layer having copper, indium, gallium, and selenide.
3. (ORIGINAL) The method according to claim 2 wherein said substrate is selected from the group consisting of glass, amorphous glass, and soda-lime silica glass.
4. (ORIGINAL) The method according to claim 3 further including applying a molybdenum layer to said substrate.
5. (ORIGINAL) The method according to claim 4 further including adjusting said semiconductor layer composition by physical vapor deposition.
6. (PREVIOUSLY PRESENTED) The method according to claim 4 further including adding indium to said semiconductor layer by physical vapor deposition.

7. (CURRENTLY AMENDED) A method for preparing a copper-indium-gallium-diselenide film comprising:

providing a substrate;

providing a buffered electro-deposition bath having a pH ranging from approximately 2-3 and containing ions of copper, indium, gallium, and selenide, and containing potassium biphthalate and sulphamic acid;

placing said substrate in said buffered electro-deposition bath to form a semiconductor layer having copper, indium, gallium, and selenide; and

depositing indium on said semiconductor layer by physical vapor deposition.

8. (ORIGINAL) The method according to claim 7 wherein said substrate is selected from the group consisting of glass, amorphous glass, and soda-lime silica glass.

9. (ORIGINAL) The method according to claim 8 further including applying a molybdenum layer to said substrate.

10. (CURRENTLY AMENDED) A method of fabricating a thin film photovoltaic device, comprising:

(a) providing a substrate;

(b) applying a molybdenum layer to said substrate by radio frequency sputtering;

(c) providing a buffered electro-deposition bath having a pH ranging from approximately 2-3 and containing ions of copper, indium, gallium, and selenide, and containing potassium biphthalate and sulphamic acid;

(d) placing said substrate in said buffered electro-deposition bath to form a semiconductor layer having copper, indium, gallium, and selenide;

(e) adjusting said semiconductor layer composition by depositing indium by physical vapor deposition;

(f) depositing a n-type semiconductor layer by chemical bath deposition on said semiconductor layer, wherein said n-type semiconductor layer is comprised of cadmium sulfide;

(g) depositing a first zinc oxide layer by radio frequency sputtering to said n-type semiconductor layer;

(h) depositing an aluminum oxide doped zinc oxide layer by radio frequency sputtering to said first zinc oxide layer;

(i) applying a Nickel/Aluminum electrical contact layer to said aluminum oxide doped zinc oxide layer; and

(j) depositing an anti-reflective coating composed of magnesium fluoride onto said electrical contact layer.

11. (ORIGINAL) The method according to claim 10 wherein said substrate is selected from the group consisting of glass, amorphous glass, and soda-lime silica glass.

12. (CANCELLED) The method according to claim 2 wherein said buffered electrodeposition bath contains a solution of potassium biphthalate and sulphamic acid.

13. (CANCELLED) The method according to claim 7 wherein said buffered electrodeposition bath contains a solution of potassium biphthalate and sulphamic acid.

14. (CANCELLED) The method according to claim 10 wherein said buffered electrodeposition bath contains a solution of potassium biphthalate and sulphamic acid.

15. (CURRENTLY AMENDED) A bath for forming a copper-indium-gallium-diselenide film comprising:

an aqueous solution containing copper ions, indium ions, gallium ions and selenium ions and ; and

a buffer solution having a pH ranging from approximately 2-3 and containing potassium biphthalate and sulphamic acid.

16. (CANCELLED) The bath of claim 15 wherein said buffer solution comprises potassium biphthalate and sulphamic acid.

17. (PREVIOUSLY PRESENTED) The bath of claim 16 further including supporting electrolytes selected from LiCl, NaCl and Na₂SO₄.